

DESCRIPTIONS OF SOME NEW OR LITTLE KNOWN SHELLS
OF PULMONATE MOLLUSCA FROM THE OLIGOCENE AND
EOCENE FORMATIONS OF ENGLAND.

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PLATE VI.

THE shells referred to in the present paper were collected many years ago by the late Frederick Edwards, and now form part of the "Edwards Collection" in the Natural History Museum.

In 1852 Mr. Edwards contributed to the Palæontographical Society his famous memoir on the British Eocene Pulmonata, since which time the only paper of importance has been that of Mr. J. S. Gardner, on "The Land Mollusca of the Eocenes," published in the Geological Magazine (1885, pp. 241-251). This included a review of many of Edwards' species, but did not deal, except very briefly and without figures, with the new shells which were named in MS. by Mr. Edwards, and which formed part of his collection. The purport of the present paper, therefore, is to give these names a real significance by figures and descriptions, and so to place them on a scientific basis.

Eight new forms are described, and remarks made upon two or three established species, to which some of the specimens have been referred. The majority were obtained from the Oligocene formation in the Isle of Wight, whilst a few others came from the Lower Eocene deposits of the London Basin.

For the sake of clearness we herewith name the beds in descending order which constitute these two formations:—

Oligocene.—Hempstead, Bembridge, Osborne and Headon Beds.

Eocene.—Barton, Bracklesham, London Clay, Oldhaven, Woolwich and Reading, and Thanet Beds.

HELIX, Linn., 1767.

HELIX PSEUDO-GLOBOSA, (?) Orbigny. Pl. VI. Fig. 15.

Helix globosa, J. Sowerby.—Mineral Conchology, 1817, vol. ii. pl. clxx.; *non* Montagu, 1803.

Helix pseudo-globosa, Orbigny.—Prod. Pal. Strat. 1850, vol. ii. p. 410.

Helix globosa, F. E. Edwards.—Mon. Pal. Soc. 1852, p. 63, pl. x. fig. 2.

Helix (Calocochlea) globosa, J. S. Gardner.—Geol. Mag. 1885, pl. vi. fig. 6, pp. 248, 249.

Helix Etheridgei (Edwards MS.), R. B. Newton.—Syst. List Edwards Coll. British Museum, 1891, p. 271.

The specimen here referred to probably represents the young stage

of Sowerby's species, *H. globosa*, as first suggested in the Geological Magazine for 1885 by Mr. J. S. Gardner, and we gladly recognize it as such, since it will do away with the necessity of registering a new species. It is a highly crystalline cast, exhibiting a very depressed spiral region, containing three gradually increasing whorls separated by a rather deep suture and bordered by a subangulate peripheral margin; the apex is very obtuse; aperture elongate, narrow and subquadrangular, extending beneath to the umbilical cavity, which appears to be covered by an expansion of the inner lip. Diam. 7; alt. 4.5 mm. Sowerby's type specimen of the species in the National Collection is one of the largest terrestrial shells found in British Tertiary deposits; it measures 55 mm. in diameter, and is about the same in elevation.

Formation.—Oligocene (Bembridge Beds). *Localities*.—Sconce and Headon Hill.

VITREA, Fitzinger, 1833.

VITREA SCONCIENSIS, n.sp. Pl. VI. Fig. 13.

Helix Sconciensis (Edwards MS.) J. S. Gardner.—Geol. Mag. 1885, p. 249. R. B. Newton.—Syst. List Edwards Coll. British Museum, 1891, p. 271.

Shell much depressed, orbicular, subdiscoidal and umbilicated; volutions five; suture deep; spire slightly elevated; surface ornamented with numerous closely set, raised and oblique lines, which extend over the whorls to the umbilical perforation; lip simple; other apertural characters indistinct (filled with matrix). Diam. 9; alt. 4 mm.

This species approaches most closely to *Helix D'Urbani*, F. E. Edwards,¹ which occurs in the same beds, but we have made a distinction on account of the highly ornamented condition of our specimen, its much more depressed spiral region and slightly larger umbilicus. Sandberger² recognises *H. D'Urbani* under the genus *Hyalinia* of Charpentier, but this name, according to the law of priority, must be abandoned in favour of Fitzinger's *Vitrea*, the type of which is *Helix crystallina*, Müller. Mr. E. A. Smith gives an interesting synonymy of these genera in the Journ. Conchology, 1891, p. 339.

Formation.—Oligocene (Bembridge Beds). *Locality*.—Sconce, Isle of Wight.

VITREA LEIA, n.sp. Pl. VI. Fig. 14.

Helix leia (Edwards MS.), R. B. Newton.—Syst. List Edwards Coll. British Museum, 1891, p. 270.

Shell depressed, discoidal and umbilicated; volutions four, regularly increasing, apex very obtuse; aperture sub-ovate and extending beneath

¹ Mon. Pal. Soc. 1852, p. 62, pl. x, fig. 5.

² Land-u-Süssw.-Couch. Vorwelt, 1873, p. 294, pl. xvii. fig. 7.

to the umbilical margin; umbilicus small and deep; surface polished and bearing numerous obscure lines of growth. Diam. 6; alt. 2.5 mm.

This is a small and delicately formed shell, having a contour very similar to the existing species *Vitrea cellaria*. The fossil appears to differ from it, however, in its much more depressed spire. Our species is evidently exceedingly rare, as the example described is the only one known to us.

Formation.—Oligocene (Headon Beds). *Locality*.—Headon Hill.

PUPA, Draparnaud, 1801.

PUPA MULTISPIRATA, n.sp. Pl. VI. Fig. 6.

Pupa multispirata (Edwards MS.), R. B. Newton.—Syst. List Edwards Coll. British Museum, 1891, p. 273.

Shell elongate, cylindrical, narrow and turritid; spire consisting of six volutions with an obtuse summit; whorls obtusely angulated at the shoulder, compressed at the sides, and separated by a deep and slightly oblique suture; the four intermediate whorls increase so gradually that they appear of almost similar size; aperture perforated. Alt. 5; diam. 2 mm.

These characters are drawn up from a specimen which is merely a cast in calcite, occasioning, of course, some doubt as to its correct generic determination. We, however, think it advisable to adopt Mr. Edwards' opinion until more perfect material is obtainable. In the meanwhile we may refer to a cylindrical species of this genus (from similar beds), already described by Edwards as *Pupa perdentata*, which differs from the present specimen in its greater depth of whorl and much more oblique suture.

Formation.—Oligocene (Bembridge Beds). *Locality*.—Headon Hill.

ISTHMIA,¹ J. E. Gray, 1840.

ISTHMIA DUBIA, n.sp. Pl. VI. Fig. 5.

Zua dubia (Edwards MS.). *Cochlicopa dubia*, R. B. Newton.—Syst. List Edwards Coll. British Museum, 1891, p. 274.

Shell small and tumid; spire with five volutions; suture horizontal; body whorl ventricose and occupying more than half the spiral axis; remaining whorls gradually increasing, narrow and convex; apex obtuse; surface smooth, polished; aperture semi-oval, perforated, without teeth; lip unreflected. Alt. 3; diam. 2 mm.

We have removed this species from the genus *Cochlicopa* on account of its obtuse summit. In some respects it resembles *Vertigo Novi-gentiensis*, described by Sandberger,² from the Paris Basin Eocene,

¹ Gray's earliest reference to this name occurs in the London Medical Repository, 1821, p. 239, where it was used, however, in a trinomial sense (*Helix Isthmia cylindrica*) and cannot be adopted. The name must date from 1840, when he used it for a section of *Vertigo*.

² Land-u-Süssw.-Conch. Vorwelt, 1872, p. 231, pl. xiii. fig. 22.

a form which has been rather recently re-figured and recognized as an *Isthmia* by M. Cossmann.¹ After a careful examination of the generic type (*Pupa edentula*, Draparnaud) we do not hesitate to place our specimen in the same genus.

Formation.—Oligocene (Cambridge Beds). *Locality*.—Headon Hill.

MEGASPIRA, Isaac Lea, 1839.

MEGASPIRA CYLINDRICA, n.sp.

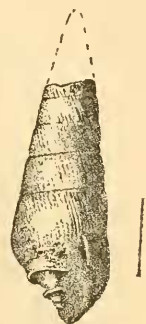
Megaspira cylindrica (Edwards MS.), J. S. Gardner.—*Geol. Mag.* 1885, p. 251. R. B. Newton.—*Syst. List Edwards Coll. British Museum*, 1891, p. 274.

Shell elongate, cylindrical and tapering; whorls flattened, gradually increasing and separated by a moderately deep suture; body whorl angulate at the shoulder; ornamented with slightly undulating, oblique and closely set longitudinal striations which terminate at the angulation of the last whorl; base smooth or only obscurely striated; columella furnished with three nearly transverse lamellar plications, beneath which is a clearly defined parietal ridge having the appearance of being flanged posteriorly. Alt. 11 mm.; diam. 4 mm.

This species is founded on a unique specimen, though unfortunately imperfect. Only six whorls are preserved, and the aperture, filled with iron pyrites, is much fractured. The columellar characters and the position of the parietal plication are, however, sufficient to relegate it to the genus *Megaspira*, which has for its type *M. Ruschenbergiana*, Lea=*Pupa elatior*, Spix. Its nearest analogue is the *M. elongate* of Melville, from the Lower Eocene of the Paris Basin. Our specimen differs from that form, however, in its larger and less oblique columellar plications, as well as in its bearing more boldly defined longitudinal striations. Since Edwards' identification of this specimen in MS., Mr. J. S. Gardner has referred to it briefly in the *Geol. Mag.* for 1885, but without description or figure.

The occurrence of this genus, a land-shell, in a marine formation like the London Clay is additional evidence of the proximity of terrestrial conditions during the deposition of those beds. In further confirmation of this we may refer to the vegetable remains, etc., found in the London Clay at Sheppey, and to the two rare Mollusca from strata of the same age, viz. *Amphidromus* [*Bulinus*] *tenistriatus*, G. B. Sowerby,² discovered at Primrose Hill, and *Camptoceras priscum*, Godwin-Austen,³ from Sheerness, a land and a fresh-water genus respectively.

Formation.—Eocene (London Clay). *Locality*.—Finchley.



Megaspira cylindrica, n.sp.

¹ Ann. Soc. R. Mal. Belgique, 1889, vol. xxiv. p. 359, pl. xii. fig. 23.

² London Geol. Journ. 1846, p. 20.

³ Quart. Journ. Geol. Soc. 1882, vol. xxxviii. p. 220, pl. v. figs. 1-7.

MEGASPIRA MONODONTA, n.sp. Pl. VI. Fig. 3.

Pupa monodonta (Edwards MS.), *Megaspira monodonta*, J. S. Gardner.—Geol. Mag. 1885, p. 251. R. B. Newton.—Syst. List Edwards Coll. British Museum, 1891, p. 274.

Shell elongate and cylindrical; whorls slightly convex, body whorl rounded at the shoulder; ornamented with closely set, rather acute, undulating, oblique ridges, which continue, though not so prominently, over the base of the shell to the columella; aperture narrow; columella furnished with three oblique laminae, beneath which, on the body whorl, is the typical parietal plication. Alt. 8; diam. 4 mm.

One example only of this species is known to us, and that is imperfect. It consists of the last two whorls, with a well-preserved aperture containing all the elements of this genus. It differs primarily from *M. cylindrica* in possessing a rounded shoulder and in the more distinct continuation of the ornamental striations over the base to the columella; the columellar plications are also disposed more obliquely. The specific name is not very applicable, but in view of the fact that it has been introduced into literature we prefer to retain it. Mr. Edwards, no doubt, was guided in his designation by reason of the prominent parietal plication, which, of course, was not characteristic of *Pupa*, under which genus he incorrectly arranged it. To Mr. J. S. Gardner is due the credit for having first recognized this specimen as a form of *Megaspira*.

Formation.—Oligocene (Bembridge Beds). *Locality*.—Headon Hill.

COCHLICOPA (Férussac, 1819), Risso, 1826.

COCHLICOPA HEADONENSIS, n.sp. Pl. VI. Fig. 4.

Zua Headonensis (Edwards MS.), *Cochlicopa Headonensis*, R. B. Newton.—Syst. List Edwards Coll. British Museum, 1891, p. 274.

Shell elongate and sub-cylindrical; number of whorls uncertain; apex missing; last whorl of large size; suture slightly oblique; aperture narrow, ovate; surface plain. Alt. 4; diam. 2 mm.

This species is founded on a somewhat imperfect cast, with the apex wanting. Three volutions only can be traced, the two earlier ones indicating a gradual increase in width with slightly flattened sides; the body whorl is long and would probably measure about half the length of the entire shell. We have followed Mr. Edwards in referring this specimen to *Cochlicopa*, or *Zua* as he called it, the former name taking precedence on account of its earlier date. The general contour and appearance of this species bears a similarity to the type form (*Helix lubrica*, Müller) of the genus. So far as we are aware this genus has not been recorded from beds of a similar age elsewhere.

Formation.—Oligocene (Bembridge Beds). *Locality*.—Headon Hill.

LIMNÆA, Lamarck, 1799, em. S. Rang, 1829.

LIMNÆA HEADONENSIS, n.sp. Pl. VI. Fig. 2.

Limnæa, n.sp., R. B. Newton. — Syst. List Edwards Coll. British Museum, 1891, p. 280.

Shell narrow, elongate, composed of eight whorls with rather compressed sides; volutions increasing gradually at first, afterwards more rapidly; spire moderately short and very acute; body whorl extending rather more than two-thirds the entire length of the shell, obtusely angulated at the shoulder; aperture narrowly ovate and contracted anteriorly; columella fold prominent, strongly twisted, nearly round, and obscurely sulcated; inner lip covered with a thin expansion; internal structure of test irregularly corrugated. Alt. 38; diam. 19 mm.

This species differs from all other Tertiary forms of the same genus by reason of its pronounced angularity at the shoulder, which, however, becomes more obtuse with age. The great length of the aperture is also very characteristic. In some of its details it approaches both *Limnaea fusiformis*, J. Sowerby, and *L. caudata*, Edwards, which occur on the same geological horizon. This species is represented in the National Collection by two specimens, the type figured being rather smaller than the other, but in a better state of preservation.

Formation.—Oligocene (Headon Beds). *Locality.*—Headon Hill.

PITHARELLA, F. E. Edwards.

Geologist, 1860, pl. v. figs. 1-3, p. 210.

Generic Characters.—"Shell sub-cylindrical; spire obtuse, more or less produced; aperture oval-oblong, rounded in front, narrowed behind; columella straight, or very obliquely twisted, arched anteriorly; outer lip simple, acute; inner lip thickened."—Edwards.

PITHARELLA RICKMANI, F. E. Edwards. Pl. VI. Figs. 7-9.

Voluta, C. Rickman.—Geologist, 1860, p. 151. *Pitharella Rickmani*, F. E. Edwards.—Geologist, 1860 (reference as above). S. V. Wood.—Mon. Pal. Soc. 1877, p. 339. R. B. Newton.—Syst. List Edwards Coll. 1891, p. 280.

"Shell oval-oblong, smooth; spire sub-conical, short, varying in height in different specimens; whorls five or six, depressed on the posterior margins, and obtusely angulated on the shoulders. The sutural edge is slightly thickened, forming a narrow, upright, ribbon-like band, pressed against the preceding whorl, and feebly crenulated by the lines of growth; in well-preserved specimens the margin immediately in front of the sutural band presents two or three obscure concentric furrows. The last whorl is somewhat attenuated towards the base; the aperture is entire, rounded in front, narrow behind, and very long, nearly equalling four-fifths of the entire length of the shell; the columella is obscurely and very obliquely twisted, and anteriorly is much curved; the outer lip is slightly arched, simple, and sharp on the edge; the inner lip is posteriorly thickened and narrow, anteriorly effuse, flattened, and reflexed, forming an angular ridge on the columella, and confluent with the outer lip."—Edwards.

Dimensions of the largest specimen figured.—Alt. 45; diam. 24 mm.

We have considered this unique species of so much importance in the history of the British Eocene Pulmonata, that we have ventured to reproduce Mr. Edwards' original figures as well as his description of both genus and species. The author regarded his new genus as an aberrant form of the Linnæidæ, and placed it between *Linnæa* and *Chilina*. This view, we believe, has not since been questioned, though prior to his examination it was supposed by Mr. Rickman to resemble *Voluta*, an erroneous determination, however, as there were no indications of the columellar plaits so characteristic of that genus. The species was discovered in some abundance in the Woolwich Beds by Mr. Rickman in 1860 (associated with fluviatile shells, *Cyrena*, etc., and remains of a terrestrial flora) when the South High-Level Sewer was being constructed between Peckham and Dulwich. We have not heard of its occurrence elsewhere in the London Basin, and as far as we can testify the genus is entirely unknown in Continental areas, and is not living at the present day.

Formation.—Eocene (Woolwich Beds). *Localities*.—Peckham and Dulwich.

PLANORBIS, E. L. Geoffrey, 1767.

PLANORBIS INCERTUS, n.sp. . Pl. VI. Fig. 12.

Planorbis incertus (Edwards MS.), R. B. Newton. — Syst. List Edwards Coll. British Museum, 1891, p. 282.

Shell dextral, discoidal and depressed; whorls six, sub-cylindrical, gradually increasing and divided by a deep suture; umbilical area wide and moderately concave; surface ornamented with closely arranged minute concentric lines, and bearing five or six equidistant carinæ, producing obtuse angulations; striæ of growth well defined. Diam. 9; alt. 2.5 mm.

This elegant little specimen is the sole example known to us. It exhibits a basal surface only, the upper part of the test being embedded in the surrounding matrix. The shell is fractured in places, displaying the east, on which the carinæ are distinctly seen encircling the whorls. These keels and the minute concentric striæ serve to distinguish this species from the *Planorbis Sparnacensis*, Deshayes, which occurs in the Lower Eocene of France. The French species exhibits many features in common with the English form, but beyond numerous lines of growth which cover the whorls it is entirely destitute of any ornamentation.

Scarles Wood described and figured a somewhat similar shell from the Woolwich Beds of Dulwich, in the Mon. Pal. Soc. 1877, p. 340, pl. xxxiv. fig. 1, which he doubtfully referred to *P. levigatus*, Deshayes, but as his identification was based upon casts it is highly probable that his specimen might be more correctly determined as *P. incertus*; however, not having seen his type, we are unable to give any decided opinion regarding it.

Formation.—Eocene (Woolwich Beds). *Locality*.—Peckham.

